15. (New) The image processing device of claim 12, wherein said sensor is located directly on a face of the display panel.

REMARKS

This is in response to the Office Action dated December 2, 2002. New dependent claims 13-15 have been added. Claims 1-15 are pending. Attached hereto is a marked-up version of the changes made to the claim(s) by the current amendment. The attached page(s) is captioned "**Version With Markings To Show Changes Made.**"

Claims 1-12 stand rejected under 35 U.S.C. Section 112, first paragraph, for the reasons set forth in paragraph 2 of the Office Action. In particular, the Office Action cites U.S. Patent No. 6,388,648 and contends that change of brightness will lead to unpredictable and possibly unacceptable color shift. This Section 112 rejection is respectfully traversed for at least the following reasons.

The instant specification, including the drawings, clearly teach one of skill in the art how to make and use the instant claimed inventions. Detailed circuitry is illustrated for purposes of example in Figs. 1, 7, and 8. One of skill in the art could have easily made examples of the instant invention based on the disclosure as filed. Potential negative effects of brightness adjustments on color balance are overcome by adjusting the light source based upon screen brightness measured directly by an optical sensor(s) placed on the display panel and/or by controlling the light source based at least on a measured temperature thereof.

The cited '648 Patent teaches directly away from certain embodiments of the instant invention. The '648 Patent teaches that it is *undesirable* to adjust the output of an arc lamp used to illuminate an LCD panel (col. 7, lines 30-35). In contrast with embodiments of the instant invention, the '648 Patent teaches that lamp adjustments should *not* be made, and that the LCD driving signals (which are supplied to the various pixels in the display panel – not to the light source) alone should be used to adjust display output (col. 7, lines 30-40). Just because the '648 Patent teaches away from embodiments of the instant invention does not mean that the instant invention is not enabled. If this were the law (which it is not), then most patentable subject matter would be subject to rejection under Section 112, first paragraph; this clearly is not the purposes or function of the statute. The instant specification illustrates in detail (much more detail than necessary) how to make and use examples of the instant inventions. This Section 112 rejection is incorrect, and lacks merit.

Claim 1 stands rejected under 35 U.S.C. Section 103(a) as being allegedly unpatentable over Tsuzuki (apparently US 6,388,716) in view of Suzuki (apparently JP Application No. 09-030434). This Section 103(a) rejection is respectfully traversed for at least the following reasons.

Claim 1 requires "an optical sensor for measuring how the liquid crystal panel is emitting R, G, and B light, a temperature sensor and a lamp temperature circuit for determining a temperature of the light source; wherein light emission of the light source is controlled according to a measurement value obtained from the optical sensor in order to correct brightness or chromaticity or both of the liquid crystal panel, and also based

upon the temperature of the light source as determined by the temperature sensor and the lamp temperature circuit." For example, see Fig. 7 of the instant application which illustrates temperature sensor 12 and lamp temperature circuit 13 for determining a temperature(s) of the light source 11; and wherein light emission of the light source 11 is controlled according to measurements from both optical sensor(s) 2R, 2G and/or 2B in order to correct brightness and/or chromaticity, and also according to the temperature of the light source as determined by sensor 12 and circuit 13. Thus, according to example embodiments of this invention, the source may be controlled (a) based on screen brightness measured directly by an optical sensor(s) placed on the panel so as to permit optimal control with consideration given to the influence of color shift; and (b) based upon a detected temperature of the light source which also permits optimal control with consideration given to the influence of color shift. The cited art fails to disclose or suggest the aforesaid quoted and underlined aspect of claim 1, whether taken alone or in the alleged combination.

Tsuzuki, as admitted in the Office Action, fails to control/adjust an output of a light source based upon a measured display output. Tsuzuki significantly differs from the invention of claim 1 in that Tsuzuki does not adjust backlight emissions as part of the brightness adjustment. Instead, in order to adjust brightness of the LCD panel, Tsuzuki adjusts the driver circuit signals applied to the display panel (i.e., brightness is adjusted by using different grey-scale levels in the display panel itself – *not* but adjusting the backlight). See Tsuzuki at Fig. 13 where the display driver circuit 95 is the means by which the display is adjusted.

Recognizing this deficiency in Tsuzuki, the Office Action cites Suzuki. Suzuki discloses an optical sensor which measures peripheral illuminance of an LCD. Based upon the measured illuminance of the LCD, the driving current of the backlight is adjusted in order to obtain a display illuminance.

However, both Suzuki and Tsuzuki significantly differ from certain embodiments of the instant invention in that both references fail to disclose or suggest controlling/adjusting the backlight based on a measured temperature of the backlight as recited in amended claim 1. Moreover, the reference cited by the Office Action for the alleged teaching of light source temperature measurement fails to disclose or suggest this aspect of claim 1. In particular, the temperature sensor 105 in Yamamoto (US 6,348,910) measures the temperature of the display panel – *not* of the light source (e.g., col. 12, lines 1-5 and 55-60).

Thus, even if the three references were combined as alleged in the Office Action (which applicant believes would be incorrect in any event), the invention of claim 1 still would not be met. None of the three cited references disclose or suggest "a temperature sensor and a lamp temperature circuit for determining a temperature of the light source . . . . light emission of the light source is controlled . . . . based upon the temperature of the light source as determined by the temperature sensor and the lamp temperature circuit" as called for by claim 1.

Claim 10 requires "at least first, second and third separate and distinct optical sensors for measuring how the liquid crystal panel is emitting R (red), G (green), and B (blue) light, respectively, so that R, G and B light output from the liquid crystal panel is

measured independently . . . . brightness of the liquid crystal panel is corrected by controlling light emission of the backlight according to the measurement value obtained from the optical sensors." In other words, claim 10 requires separate and distinct sensors for measuring R, G and B display output, respectively (e.g., see sensors 2R, 2G and 2B in Fig. 7), and then controlling brightness based upon the same. The cited art fails to disclose or suggest this aspect of claim 10, either taken alone or in the alleged combination.

Claim 12 requires that "brightness or chromaticity or both of image(s) output from the display panel is corrected by controlling light emission of the light source according to a measurement value obtained from the sensor, and also in accordance with a *measured temperature of the light source*." The cited art fails to disclose or suggest this aspect of claim 12, either taken alone or in the alleged combination.

For at least the foregoing reasons, it is respectfully requested that all rejections be withdrawn. All claims are in condition for allowance. If any minor matter remains to be resolved, the Examiner is invited to telephone the undersigned with regard to the same.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

1. (Amended) An image display device, comprising:

a liquid crystal panel for displaying an image including RGB colors;

a light source for emitting light toward the liquid crystal panel that the liquid crystal panel receives and uses for display operation thereof; and

an optical sensor for measuring how the liquid crystal panel is emitting R, G, and B light,

a temperature sensor and a lamp temperature circuit for determining a temperature of the light source;

wherein light emission of the light source is controlled according to a measurement value obtained from the optical sensor in order to correct brightness or chromaticity or both of the liquid crystal panel, and also based upon the temperature of the light source as determined by the temperature sensor and the lamp temperature circuit.

10. (Amended) An image display device comprising:

a liquid crystal panel for displaying an image;

a backlight for illuminating the liquid crystal panel from behind;

at least first, second and third separate and distinct optical sensors for measuring how the liquid crystal panel is emitting R (red), G (green), and B (blue) light,

respectively, so that R, G and B light output from the liquid crystal panel is measured independently[an optical sensor for measuring brightness of at least part of an image emitted from the liquid crystal panel];

a signal reading circuit for converting [a]measurement values obtained from the optical sensors into a current brightness value of the liquid crystal panel;

a brightness setting circuit for permitting entry of specified brightness of the liquid crystal panel;

a converting circuit for converting an output of the brightness setting circuit into a specified brightness value of the liquid crystal panel;

a calculator for calculating a difference between the current brightness value and the specified brightness value of the liquid crystal panel;

a duty factor setting circuit for outputting a pulse signal whose duty factor depends on an output of the calculator; and

an inverter for producing a driving voltage and a driving current for the backlight according to the pulse signal,

wherein the brightness of the liquid crystal panel is corrected by controlling light emission of the backlight according to the measurement value obtained from the optical sensors.

11. (Amended) An image display device as claimed in claim 10, further comprising:

[a plurality of said optical sensors for measuring how the liquid crystal panel is emitting R, G, and B light independently for the R, G, and B light; a]said signal reading circuit for converting measurement values obtained from the optical sensors into a current brightness value and a current chromaticity value of the liquid crystal panel;

a thermistor whose resistance varies with surface temperature of the backlight;

a temperature reading circuit for converting the resistance of the thermistor into a surface temperature value of the backlight; and

converting means for converting an output of the temperature reading circuit into a specified brightness value of the liquid crystal panel,

wherein brightness and chromaticity of the liquid crystal panel are corrected by controlling light emission of the backlight according to the measurement values obtained from the optical sensors in such a way that the surface temperature of the backlight is kept constant.

12. (Amended) An image processing device including a display panel and a light source that emits light that is received and used by the display panel to produce an image, comprising:

a sensor for measuring how light is emitted from the display panel,

wherein brightness or chromaticity or both of image(s) output from the display panel is corrected by controlling light emission of the light source according to a measurement value obtained from the sensor, and also in accordance with a measured temperature of the light source.